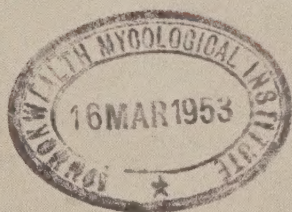


ALL GOLD



A New
High-vitamin,
High-yielding
Sweet Potato

By H. B. CORDNER
Horticulturist, Vegetables



OKLAHOMA AGRICULTURAL EXPERIMENT STATION

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ALLGOLD

A New High-vitamin, High-yielding Sweet Potato

By H. B. CORDNER*
Horticulturist, Vegetables

"Allgold" is a new high-vitamin, high-yielding, "yam-type" sweet potato developed and released by the Oklahoma Agricultural Experiment Station. Allgold is now in commercial production. The new variety, which was tested in Oklahoma and other states under the designation "Oklahoma 24," is a table or market type similar to Unit No. 1 Porto Rico.

Allgold produced nearly double the yield of No. 1 Porto Rico, as an average of tests at two locations in Oklahoma in 1948 and 1949. It is at least equal, if not superior, to the Porto Rico in taste and table appearance; and it contains 50 percent more ascorbic acid (vitamin C) and more than three times as much carotene (provitamin A). Allgold has shown resistance to stem rot in inoculation tests, but may be somewhat more susceptible than Unit No. 1 to nematode damage.

The new variety matures early enough to give a fair harvest of marketable sweet potatoes in August in Oklahoma, and its early formation of roots helps it give better yields when the normal growing period is allowed.

Canning trials in Oklahoma, Mississippi, and Georgia indicate that Allgold makes a superior product, particularly in the "sliced or pieces" pack which reveals the full color of the flesh. It rates high in flavor and solidity, and the earliness of root formation provides a longer canning season.

In regional tests conducted cooperatively by the Southern experiment stations, Allgold ranked high in nutrition and yield among other varieties and breeding lines.

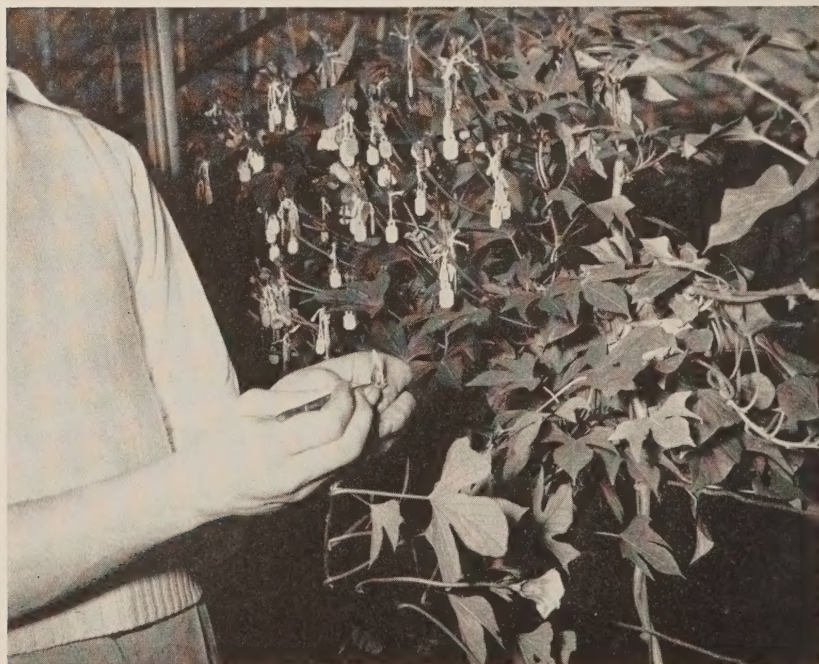
* The author wishes to acknowledge the aid of sweet potato cooperators at experiment stations in the Southern States Cooperative group—Mississippi, Maryland, Georgia, Louisiana, North Carolina, South Carolina, and Virginia; and Charles Galeotti and H. R. Hedger, superintendents of the Bixby and Idabel experiment stations, respectively; F. Ben Struble and Lou S. Morrison, Department of Plant Pathology; and Ruth Reder, Department of Agricultural Chemistry Research.

ORIGIN AND HISTORY

Allgold originated as an open-pollinated seedling of parent No. 10 at the Station greenhouse. Parent No. 10 originated in turn in a cross between a selfed seedling of Creole and an open-pollinated seedling of Triumph. After preliminary trials at the Vegetable Research Station at Bixby, Okla., Allgold, then designated as "Oklahoma 24," was placed in observation trials at the several southern states and with selected sweet potato growers in Oklahoma. In 1949, it was grown in the nutritional trials of the Southern Stations.

DESCRIPTION

Allgold is a gold-skinned, high-carotene sweet potato variety for table use. It is in the same market class ("yam-type") as Porto Rico, and will be compared with this variety by both growers and consumers.



Allgold originated as an open-pollinated seedling of parent No. 10 at the Station greenhouse, where crosses were made and seed obtained from plants forced into bloom, as shown above. Vines are tagged to indicate parentage of experimental crosses. Parent No. 10 originated in a cross between a selfed seedling of Creole and an open-pollinated seedling of Triumph.



A good crop of Allgold sweet potatoes is shown in a field near Sapulpa. This crop was harvested at the conclusion of the dry 1952 season.

The trailing stem is purple, of moderate vigor and only of moderate length, with fairly short internodes. Some pubescence is present at terminals of vines. Foliage is moderately dense, leaf blades are entire and somewhat heart-shaped at the base. Petioles are erect, medium to short, green at the terminals and purple at the base of the vines.

The roots have russet-golden skin with carotene in the skin and immediately beneath it. They are generally smooth, of fusiform shape, and may be of medium to large size. The flesh is of bright salmon color and remains bright when cooked. The baked flesh is sweet, moist, and a little firmer than that of Porto Rico. The roots keep well in storage and produce a satisfactory number of slips when bedded.

PERFORMANCE

Allgold was placed in field trials in 1948 at the Vegetable Research Station, Bixby, Okla., and Kiamichi Field Station, Idabel, Okla. In 1949, it was placed in the nutritional and yield trials of the Southern Cooperative group, and in 1950 it was listed in tests conducted by Sweet Potato Cooperators. Allgold ranked high among several varieties and breeding lines included in these trials.

Yield data from Bixby and Idabel are given in Table 1. Unit No. 1 Porto Rico is included as a standard commercial variety.

Observations at the Oklahoma stations and reports from cooperators indicated that Allgold matures early. Earliness is shown by fair harvests of marketable roots in August and by good production from late plantings of slips, or from July-set vine cuttings. This early formation of storage roots results in a good yield when a normal growing period is allowed.

Table 1.—Yields* of Allgold and Other Sweet Potato Varieties at Bixby and Idabel, Oklahoma; 1948-1951.

Location and Variety	1948	1949	1950	1951	Average
Bixby					
	Marketable roots in Bushels Per Acre**				
Allgold	413	361	359	205	330.5
Goldrush	---	309	90	78	159.0
Unit No. 1 Porto Rico	150	137	149	85	155.3
Idabel					
	Marketable roots in Bushels Per Acre**				
Allgold	151	235	192	208	211.6
Unit No. 1 Porto Rico	---	275	124	169	189.3

* Yields are for early May plantings harvested October 20 to 30, with varieties grown in replicated plots.

** Marketable roots included the No. 1 and No. 2 grades.

Table 2.—Carotene, Ascorbic Acid, and Moisture Contents of Allgold and Other Sweet Potato Varieties Grown at Bixby, Oklahoma;* 1948-1951.

Variety	1948	1949	1950	1951	Average
Carotene (Mg./100 gm. dry weight)					
Allgold	59.8	48.8	38.3	48.1	48.8
Goldrush	---	44.0	40.0	50.8	44.9**
Unit No. 1 Porto Rico	13.4	11.1	13.8	9.1	11.9
Ascorbic acid (Mg./100 gm. dry weight)					
Allgold	99.2	88.0	85.2	92.0	91.1
Goldrush	---	82.5	82.5	70.3	78.4**
Unit No. 1 Porto Rico	71.4	60.7	48.4	58.3	59.7
Moisture (Percent)					
Allgold	75.6	74.7	75.0	76.8	75.5
Goldrush	---	76.3	71.6	77.0	74.9**
Unit No. 1 Porto Rico	73.2	72.4	72.2	73.7	72.9

* Analyses are for No. 1 roots sampled at harvest time from early May plantings. The data for each variety each year represent averages for duplicate root samples from replicated plots and, in most cases, for three harvest dates.

** Three-year average.

Flavor and color of the baked roots of Allgold have been favorably received. As indicated by analysis of the roots, the new variety is more nutritious than present commercial varieties insofar as carotene (provitamin A) and ascorbic acid (vitamin C) are concerned (Table 2).

CANNING TRIALS

Canning trials at the Oklahoma, Mississippi, and Georgia stations, and by a commercial canner at Haskell, Okla., indicate that Allgold makes a superior product when canned. The "sliced or pieces pack," which reveals the full color of the flesh, is especially attractive; and the canned product rates high in flavor and solidity.

The earliness factor in Allgold is advantageous to the canner in providing a longer canning season.

In a canning trial of 10 varieties and breeding lines in Georgia, Allgold was fourth and Unit No. 1 Porto Rico eighth.

REACTION TO DISEASES

Stem Rot or Wilt

Allgold, with an index of 60, shows considerable tolerance to stem rot in direct inoculation tests (Table 3). An index of 0 represents im-

Table 3.—Stem Rot Index* of Allgold and Other Sweet Potato Varieties and Seedlings, 1948-1952.

Variety or seedling	1948	1949	1950	1951	1952
Allgold	58**	61	55	61	60**
Unit No. 1 Porto Rico	---	92	98	82	---
Goldrush	---	49	17	29	---
Bunch Porto Rico	---	95	---	---	---
Yellow Jersey	---	---	---	92	---
Big Stem Jersey	---	---	---	94	---
Okla. Seedling (Okla. 29)	62**	---	32	18	61**

*Roots were inoculated with the stem rot fungus before the plants were set in the greenhouse or in the field. After one month in the greenhouse and at the end of the growing season in the field, each surviving plant or hill was dug separately, the stem split to observe the extent of stem rot symptoms, and assigned an index number denoting disease severity. The scale used for indexing ranged from 0 to 4; 0—no visible disease symptoms, and 4—dead or dying plant. Data from all plants of a given variety were then consolidated and converted to an index ranging from 0 to 100. An index of 100 indicates susceptibility; 0—immunity. In general, a score from 40 to 60 indicates tolerant to slightly susceptible.

** Greenhouse test. All other scores obtained from field trials.

munity, and 100, complete susceptibility. It would be difficult to translate this information into terms of performance under average field condition. Allgold generally will remain free of wilt, although in isolated cases it may be injured by certain variants of the wilt fungus. The new variety, therefore, is reported as susceptible, tolerant, and resistant by different sweet potato cooperators.

The most virulent strains of the stem rot or wilt organisms were used in the resistance tests and direct inoculations. The strains were collected from 11 sources, including Oklahoma and five other states.

Table 4.—Nematode Injury Index* and Nematode Infection Counts on Roots of Allgold and Other Sweet Potato Varieties and Breeding Lines; Perkins, 1950.

Variety or breeding line	Hill injury index (1-5)	Infections (range/root)	Infections per 100 gms. of root	Rating
Allgold	4.72	11 to 189	89.5	Susceptible
Nancy Gold	4.95	3 to 538	40.3	Susceptible
Okla. Seedling A.	4.47	4 to 1,371	102.4	Very Susceptible
H M 13 (Miss.)	1.08	0 to 4	0.3	Resistant

* Hill indexes based on four 25-plant plots of each variety. Infection counts taken on composite samples of about 15 roots of each variety. Plants were set in heavily-infected field plots on June 1, 1950 and the hill indexes obtained at harvest time on October 5. Index of 1—no injury; 5—severe injury. Infection count based on sample of about 15 roots, which were sliced into pieces approximately one-tenth of an inch thick to disclose the resident nematodes.

Table 5.—Nematode Injury Index* and Nematode Infection Counts on Roots of Allgold and Other Sweet Potato Varieties; Perkins, 1951.

Variety or breeding line	Hill injury index (1-5)	Infections (range/root)	Infections per 100 gms. of root	Rating
Allgold	3.71	12 to 80	34.1	Susceptible
Nancy Gold	4.71	42 to 210	64.3	Susceptible
Goldrush	3.12	5 to 54	18.9	Susceptible
Unit No. 1 P. R.	2.58	2 to 25	8.6	Intermediate
Yellow Jersey	1.95	0 to 12	1.9	Resistant
Heartogold	1.84	0 to 18	1.3	Resistant

* Hill indexes' average for four 10-plant plots. Procedure same as given in Table 3 footnote.



Allgold has potential as a parent in sweet potato breeding program in progress at the Station. Picture shows a promising first-year seedling originated by crossing Allgold with a nematode-resistant strain. The seedling was grown at the Kiamichi Field Station at Idabel in 1952.

Plant exposure to wilt fungus in direct inoculation tests usually is more severe than exposure in field soils.

Nematodes

The data in Tables 4 and 5 indicate that Allgold is classed with Nancy Gold as being susceptible to nematodes. Allgold also is injured more by this pest than the resistant yellow Jersey variety, and also more than the Unit No. 1 Porto Rico which is rated as of intermediate resistance or tolerant to nematodes.

Observation indicates Allgold has no more nematode susceptibility than certain varieties now commonly grown in Oklahoma.

Other Diseases

Detailed studies, including the core-grafting techniques in southern states, show that Allgold is resistant to internal cork.

In Oklahoma, Allgold roots have been relatively free of scurf, black rot and soil rot, although the exact status of the new variety with reference to resistance or susceptibility to these diseases is not known at present.

